

*6th IEA & JUPITER Joint Workshop on
Vanadium Alloys for Fusion Applications
Tucson, Arizona, June 21-22, 2002*

National Program Overviews

- Recent Status in Japan -

Katsunori ABE

Tohoku University, Sendai, Japan

Topics

- 1. Recent general situations in Japan**
- 2. JUPITER-II program**
- 3. NIFS collaboration program related with Vanadium alloys**
- 4. Research theme on Vanadium alloys presented at Fusion Energy**

Conference in Osaka, Japan, June 13-14, 2002

Recent General Situation in Japan

➤ **Cabinet Agreement on ITER Program chaired by Prime Minister Koizumi, May 31, 2002.**

based on *Agreement at General Science and Technology Council*

- To promote ITER program through international collaboration
- To select Rokkasho Village as a domestic candidate site for international negotiation

➤ **General Science and Technology Council Agreement, May 29, 2002.**

- To promote ITER program as an important R&D
- To select the best candidate site for international negotiation
- To try to build an international framework with proper balance of cost share

Supplements to Council Agreement (1)

1. Budget:

Based on second basic plan on science and technology, within nuclear R&D budget, and efficient planning including ongoing programs

2. Assessment:

Peer management and proper evaluation for continuation

3. Domestic Fusion Research:

To organize domestic research structure interconnecting ITER program, where

- (1) education of human resources
- (2) various plasma-confinement research
- (3) development of low activation materials etc.

must be considered.

Supplements to Council Agreement (2)

4. Public Acceptance:

Safety assurance and radioactive waste treatment for site invitation

5. Relation with Fast Track:

Possibility to start an international collaboration program for materials development

Irradiation Performance and System Integration of Advanced Blanket

*~ Materials integration utilizing reactor irradiation
and related basic research for advanced blanket ~*

Task 1-2: Li cooled V alloy structure

Task 1-2-A: Coating for MHD reduction

Task 1-2-B: V alloy capsule irradiation

- **Assignment Plan:** Fujiwara, Muroga, Nagasaka, etc.
- **Related Workshop:** Irradiation Effects of Vanadium Alloy Blanket Elements, Tucson, June 21-22, 2002

“ Integral Characterization of NIFS-Heat for Fusion Blanket ”

- FY2002 - 2004

Key person: K. Abe (Tohoku Univ.)

T. Nagasaka, T. Muroga (NIFS)

- NIFS, Universities, National Institutes (NIMS, etc.), Industries
- Based on High Purity V-4Cr-4Ti Alloy Fabrication
- Comparison with V-4Cr-4Ti-Si, Al, Y Alloy Series

Characterization Matrix

- Baseline Physical/Chemical Properties

*Elastic Constant, Electrical Resistance, Magnetic Susceptibility,
Vacuum Properties etc.*

- Mechanical Properties and Heat Treatment

- Corrosion and Compatibility

- Fabrication and Welding

- Coating and Joining

- Neutron and Ion Irradiation Effect

Research Theme presented at Fusion Energy Conference in Japan Osaka University, June 13-14, 2002

- Dislocation Channeling after Neutron Irradiation (Tohoku Univ.)
- Microstructure after HFIR Temperature Varying Experiment (Kyushu Univ./NIFS)
- Effects of Solid Transmutation and Helium on Microstructure (Univ. Tokyo)
- Purification by Zr Treatment and Ion Irradiation (Kyushu Univ./NIFS)
- Evaluation of NIFS-Heat (NIFS/Tohoku Univ./Others)
- Corrosion Resistance of High-Cr V-Cr-Ti Alloy (Tohoku Univ./NFI)
- Surface Segregation of Ti and Hydrogen Absorption (Toyama Univ.)
- Oxidation Characterization of V-4Cr-4Ti (Tohoku Univ.)
- Purification and Creep Behavior of V-Cr-Ti Alloy (Tohoku Univ.)
- Welding Technology (NIFS/Hiroshima Univ./ORNL)
- Microstructure and Hardness after YAG Welding (Kyushu U./NIFS/Hiroshima U.)
- Bonding Mechanism of Vanadium Alloy with Ceramics (Tohoku Univ.)